

ID: 1.4.2a

Title: Tuning Transport Properties of Graphene Systems

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Recent breakthrough in fabrication of freestanding two-dimensional (2D) crystals such as graphene layers has opened the way for fundamental study of novel quantum phenomena in 2D quantum films a few atomic layers thick. The physical properties of 2D quantum films are sensitive to structural changes because of the more direct manifestation of quantum effects at reduced dimensionality. In this talk, I will present theoretical approaches for tuning electronic transport properties of graphene related systems (single-layer and bilayer graphene and boron-nitride films and nanoribbons) based on the results obtained by first-principles calculations and non-equilibrium Green's function method, focusing on doping, adsorption, folding, and strain effects. References: [1] J.X. Zhong, G.M. Stocks, Nano Lett. 6, 128 (2006). [2] J.X. Zhong, G.M. Stocks, Phys. Rev. B 75, 033410 (2007). [3] Y.L. Mao, J.M. Yuan, J.X. Zhong, J. Phys. C20, 115209 (2008). [4] Y.L. Mao, G.M. Stocks, J.X. Zhong, Nanotechnology 19, 205708 (2008). [5] G. Gui, J. Li, and J.X. Zhong, Phys. Rev. B 78, 075435 (2008). [6] Y.L. Mao, G.M. Stocks, J.X. Zhong, N. J. Phys. 12, 033046 (2010). [7] Y.E. Xie, Y.P. Chen, J.X. Zhong, J. Appl. Phys. 106, 103714 (2009). [8] Z.L. Zhang, Y.P. Chen, Y.E. Xie, M. Zhang, J.X. Zhong, J. Phys. D: Appl. Phys. 44, 215403 (2011). [9] Z.Z. Yu, L.Z. Sun, C.X. Zhang, J.X. Zhong, Appl. Phys. Lett. 96, 173101 (2010). [10] P.L. He, Y.L. Mao, L.Z. Sun, J.X. Zhong, J. Comp. & Theor. Nanoscience 7, 1 (2010). [11] Z.Z. Yu, M.L. Hu, C.X. Zhang, C.Y. He, L.Z. Sun, J.X. Zhong, J. Phys. Chem.C 115, 10836 (2011). [12] M.L. Hu, Z.Z. Yu, K.W. Zhang, L.Z. Sun, J. X. Zhong, J. Phys. Chem.C 115, 8260 (2011).